5 SMALL PARTICLE REAGENT

5.1 INTRODUCTION

Small particle reagent (SPR) was devised and refined by the British Home Office as an effective procedure for processing wet surfaces. Surfaces, both porous and nonporous, which are wet at the time of latent print deposit or become wet after deposit, seldom retain sufficient water soluble material for conventional processing methods. Nonporous items which have been allowed to dry offer some potential if the deposit contains non-water soluble oily matter, but the drying process lessens the possibility of adequate adhesion for powders.

Molybdenum disulfide is a lipid-sensitive reagent. Initial efforts to create a suspension of molybdenum disulfide in water used photoflo as a means of reducing surface tension. These met with limited success. Introduction of photoflo to the mixture requires a critical measurement as too much photoflo prevents complete adhesion of the molybdenum disulfide particles to the lipids. Organic solvents can not be used as these solvents may remove the lipid material.

Refinements in the surfactant solution have not only improved the uniformity of suspension but have increased the application of SPR to other surfaces. SPR is very effective in the secondary treatment of cyanoacrylate ester developed impressions by adhering to faint impressions generally better than powders. Molybdenum disulfide is produced in various particle sizes. Smaller particle size is more effective: Lightning Powder Company provides the proper particle size. If distilled water is not available deionized water may be used.

5.2 PREPARATIONS

5.2.1 Surfactant Stock Solution

1. Dissolve 8 milliliters of Tergitol 7 in 500 milliliters of distilled water. This will make approximately 10 liters of working solution.

5.2.2 SPR Suspension-Working Solution

1. Add 10 grams of molybdenum disulfide to 50 milliliters of the surfactant stock solution. Add the molybdenum disulfide slowly and stir continuously.
2. The mixture should be a creamy consistency free of any dry powder.
3. While stirring continuously, add the mixture to 900 milliliters of distilled water.

5.3 MINIMUM STANDARDS AND CONTROLS

Molybdenum disulfide works by adhering to latent print residue. Due to the inherent ability to adhere and discolor these materials, there is no need for test impressions to be done prior to evidence application.

5.4 PROCEDURE OR ANALYSIS

5.4.1 Immersion Technique

1. Shake the working solution well and place in a shallow tray such as a photographic tray. The tray should be filled until it will cover the item to be processed.
2. Stir the solution again and before each item is placed into the solution.
3. Place the item to be processed in the liquid to lie as flat as possible in the tray.
4. Allow the item to remain in the suspension and the molybdenum particles to settle on the item for 30 seconds.

5. The item is then turned over and again allowed to set for 30 seconds.

6. This procedure is continued until all surfaces have been exposed to the solution.

7. The item is then placed into a tray of clear tap water. The tray can be rocked or a flow of tap water can be established in the tray. The excess SPR will readily be removed.

8. The item is allowed to dry.

9. All impressions should be photographed and can subsequently be lifted.

5.4.2 Wash Bottle Application

1. Spray a flow of SPR over the surface of the item.

2. Wash the surface with a light to moderate flow of clear tap water.

Larger items may be processed using a wash bottle to spray a flow of SPR over the surface. For outdoor application of very large items, such as a wet automobile, a garden sprayer can be used. Generally light to moderate flows of rinse water will not dislodge the molybdenum disulfide particles.

5.5 INTERPRETATION OF RESULTS

SPR lifts easily from dried, processed, nonporous surfaces but all developed impressions should be photographed prior to lifting. Faint impressions may benefit from a reprocessing of the item. The intense black color generally facilitates photographic preservation. When SPR is used as a secondary technique after cyanoacrylate ester fuming, the results are sometimes superior to powders in both adhesion and clarity of detail.

5.6 REFERENCES

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